50. Serruys P, Mohr F, on behalf of the SYNTAX investigators. The Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery: The SYNTAX Study. *European Society of Cardiology*, 2008, Munich, 2008.
51. Wiviott SD, Braunwald E, McCabe CH, Montalescot G, Ruzyllo W, Gottlieb S, Neumann FJ, Ardissino D, De Servi S, Murphy SA, Riesmeyer J, Weerakkody G, Gibson CM, Antman EM. Prasugrel versus clopidogrel in patients with acute coronary syndromes. *N Engl J Med* 2007;**357**:2001–2015.
52. Stone GW, White HD, Ohman EM, Bertrand ME, Lincoff AM, McLaurin BT, Cox DA, Pocock SJ, Ware JH, Feit F, Colombo A, Manoukian SV, Lansky AJ, Mehran R, Moses JW. Bivalirudin in patients with acute coronary syndromes undergoing percutaneous coronary intervention: a subgroup analysis from the Acute Catheterization and Urgent Intervention Triage strategy (ACUITY) trial. *Lancet* 2007;**369**:907–919.
53. King SB 3rd, Smith SC Jr, Hirshfeld JW Jr, Jacobs AK, Morrison DA, Williams DO, Feldman TE, Kern MJ, O'Neill WW, Schaff HV, Whitlow PL, Adams CD, Anderson JL, Buller CE, Creager MA, Ettinger SM, Halperin JL, Hunt SA, Krumholz HM, Kushner FG, Lytle BW, Nishimura R, Page RL, Riegel B, Tarkington LG, Yancy CW. 2007 Focused Update of the ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines: 2007 Writing Group to Review New Evidence and Update the ACC/AHA/SCAI 2005 Guideline Update for Percutaneous Coronary Intervention, Writing on Behalf of the 2005 Writing Committee. *Circulation* 2008;**117**:261–295.
54. Ndrepepa G, Berger PB, Mehilli J, Seyfarth M, Neumann FJ, Schomig A, Kastrati A. Periprocedural bleeding and 1-year outcome after percutaneous coronary interventions: appropriateness of including bleeding as a component of a quadruple end point. *J Am Coll Cardiol* 2008;**51**:690–697.
55. Yusuf S, Zhao F, Mehta SR, Chrolavicius S, Tognoni G, Fox KK. Effects of clopidogrel in addition to aspirin in patients with acute coronary syndromes without ST-segment elevation. *N Engl J Med* 2001;**345**:494–502.
56. Diener HC, Bogousslavsky J, Brass LM, Cimminiello C, Csiba L, Kaste M, Leys D, Matias-Guiu J, Rupprecht HJ. Aspirin and clopidogrel compared with clopidogrel alone after recent ischaemic stroke or transient ischaemic attack in high-risk patients (MATCH): randomised, double-blind, placebo-controlled trial. *Lancet* 2004;**364**:331–337.

CARDIOVASCULAR FLASHLIGHT

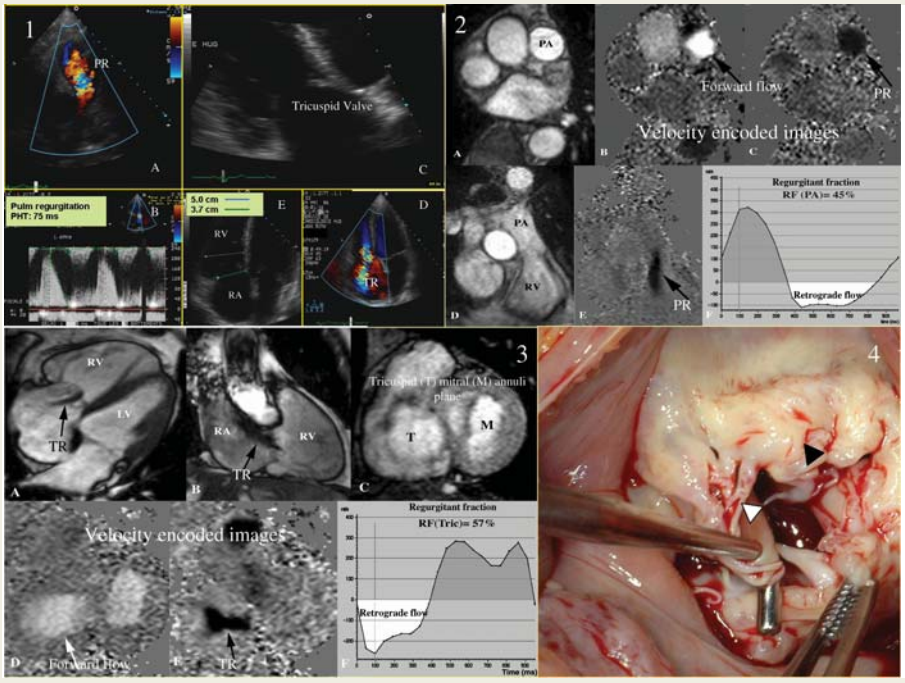
doi:10.1093/eurheartj/ehp385
Online publish-ahead-of-print 22 September 2009

Severe right bivalvular carcinoid heart disease

Amir S. Jadidi[1], Dominique Didier[2], Saziye Karaca[3], and Hajo Müller[1]*

[1]Division of Cardiology, University Hospitals of Geneva, 24, rue Micheli-du-Crest, 1211 Geneva, Switzerland; [2]Division of Radiology, University Hospitals of Geneva, 24, rue Micheli-du-Crest, 1211 Geneva, Switzerland; and [3]Division of Cardiovascular Surgery, University Hospitals of Geneva, 24, rue Micheli-du-Crest, 1211 Geneva, Switzerland

* Corresponding author. Tel: +41 22 372 72 01, Fax: +41 22 372 72 29, Email: hajo.muller@hcuge.ch



A 65-year-old man with a 1-year clinical history of recurrent flush and diarrhoea was admitted to our hospital for severe right-sided heart failure. Abdominal computed tomography scan showed carcinoid tumour originating from gut with hepatic metastases. Chemotherapy with octreotid and arterial chemo-embolization of the hepatic metastases was initiated. Transthoracic echocardiography revealed severe tricuspid and pulmonary valve regurgitation with dilation of the right heart chambers (*Figure 1A–E*). Together with the history and the thickened, retracted, and immobile leaflets, this was suggestive of carcinoid heart disease. Velocity-encoded cardiac-magnetic resonance imaging confirmed the severity of pulmonary [*Figure 2A–F*; regurgitant fraction (RF) = 45%] and tricuspid valve regurgitations (*Figure 3A–F*). Tricuspid regurgitant volume was calculated as the difference of the net pulmonary forward volume and the tricuspid inflow in diastole as well as direct quantification of flow at the tricuspid annulus (illustrated here) with similar results (RF calculated at 58 and 57%, respectively). The patient underwent successful cardiac surgery with placement of bioprosthetic valves, less prone to thrombotic and haemorrhagic complications in this situation. The operative settings showed pathological findings suggestive of carcinoid heart disease (*Figure 4*) with thickened and retracted leaflets (black arrow) and chordae (white arrow) confirmed by histology revealing valvular fibrosis and no inflammatory changes. Early post-operative follow-up showed substantial clinical improvement of right-sided heart failure.

Carcinoid heart disease is a rare cause of intrinsic tricuspid and pulmonary valve disease and leads to important morbidity and mortality caused by right-sided heart failure. Medical and in appropriate cases surgical treatment can improve quality of life and in same cases survival. This case illustrates the importance of quantification of valve regurgitations, especially in the pulmonary position, as pre-operative strategy for optimal clinical decision-making in carcinoid heart disease.